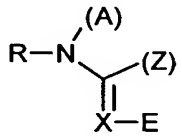
Claims

1. A composition comprising a synergistically effective active compound combination of compounds of the nicotinergic acetylcholine receptor agonists and antagonists of the formula (I)



(I)

in which

R represents hydrogen, optionally substituted radicals acyl, alkyl, aryl, aralkyl, heterocyclyl, heteroaryl or heteroarylalkyl;

A represents a monofunctional group from the group consisting of hydrogen, acyl, alkyl, aryl or represents a bifunctional group attached to the radical Z;

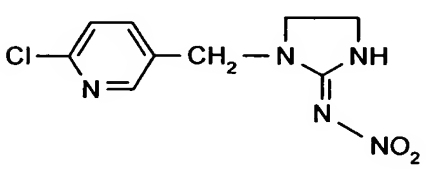
E represents an electron-withdrawing radical;

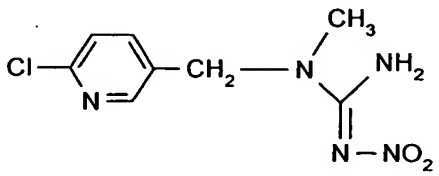
X represents the radicals -CH= or =N-, where the radical -CH= may be attached to the radical Z' instead of an H atom;

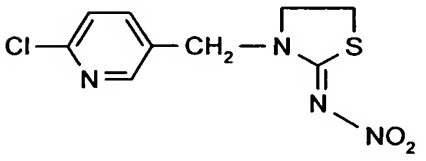
Z represents a monofunctional group from the group consisting of alkyl, -OR, -SR, $-N(R)_2$,
where the radicals R are identical or different and are as defined above,
or represents a bifunctional group attached to the radical A or the radical X,

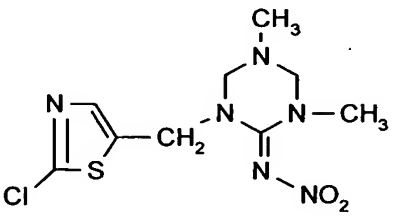
and at least one active compound from the group of the anthranilamides of the formula (II)

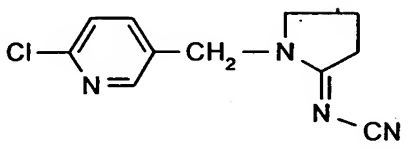
2. The composition as claimed in claim 1, comprising at least one of the following compounds of the formula (I)

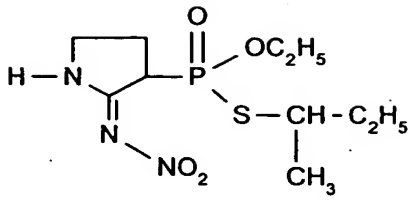


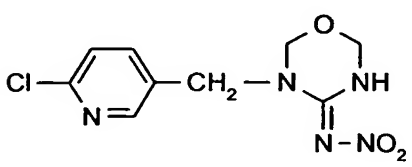


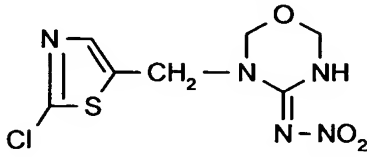


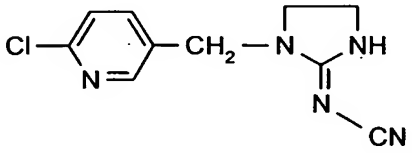


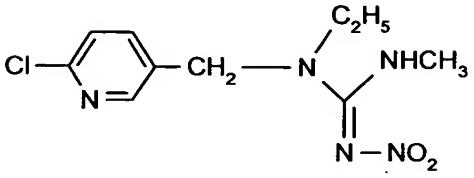


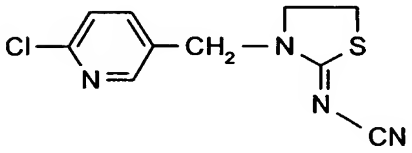


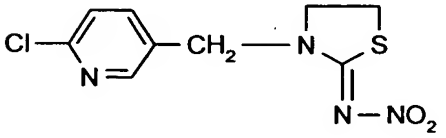


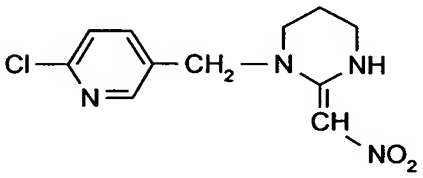


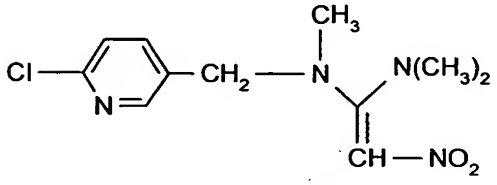


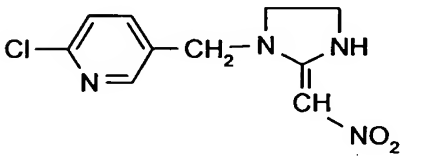


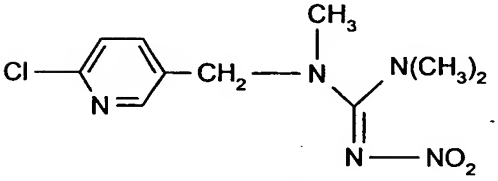


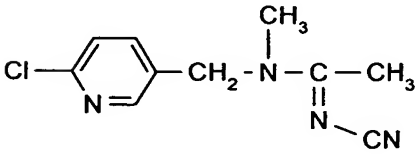


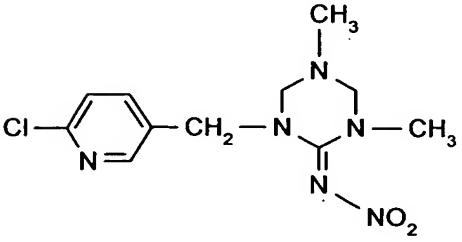


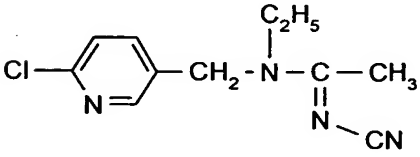


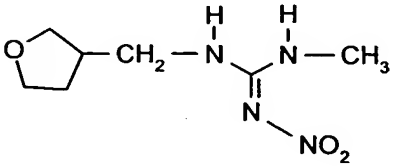


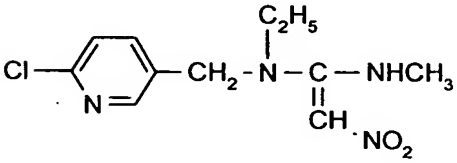


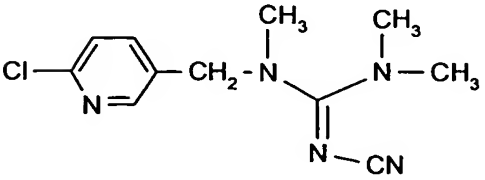


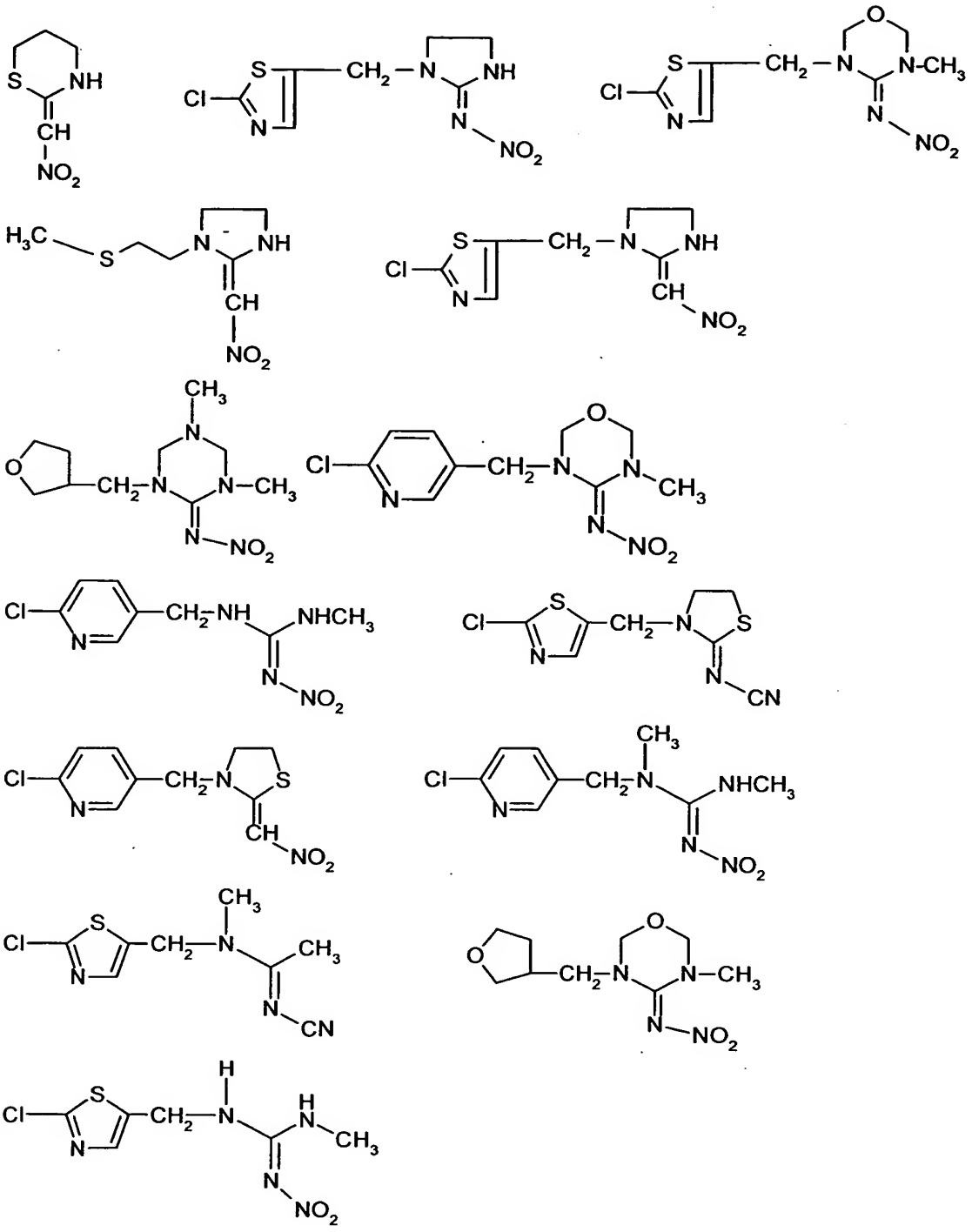




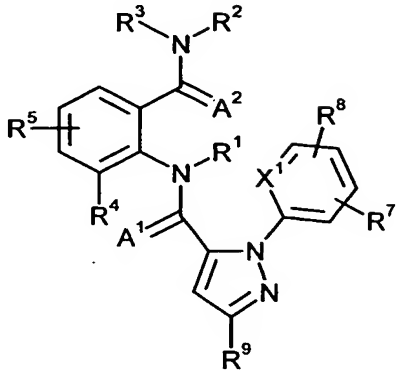








3. The composition as claimed in claim 1 or 2, comprising at least one active compound from the group of the anthranilamides of the formula (II)



(II)

in which

A^1 and A^2 independently of one another represent oxygen or sulfur,

X^1 represents N or CR^{10},

R^1 represents hydrogen or represents in each case optionally mono- or polysubstituted C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_6-cycloalkyl, where the substituents independently of one another may be selected from the group consisting of R^6, halogen, cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_2-C_4-alkoxycarbonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino, (C_1-C_4-alkyl)C_3-C_6-cycloalkylamino and R^{11},

R^2 represents hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino, C_2-C_6-alkoxycarbonyl or C_2-C_6-alkylcarbonyl,

R^3 represents hydrogen, R^{11} or represents in each case optionally mono- or polysubstituted C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, where the substituents independently of one another may be selected from the group consisting of R^6, halogen, cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_2-C_6-alkoxycarbonyl, C_2-C_6-alkylcarbonyl, C_3-C_6-trialkylsilyl, R^{11}, phenyl, phenoxy and a 5- or 6-membered heteroaromatic ring, where each phenyl, phenoxy and 5- or 6-membered heteroaromatic ring may optionally be substituted and where the substituents independently of one another may be selected from one to three radicals W or one or more radicals R^{12}, or

R^2 and R^3 may be attached to one another and form the ring M,

R^4 represents hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-haloalkyl, C_2-C_6-haloalkenyl, C_2-C_6-haloalkynyl, C_3-C_6-halocycloalkyl, halogen, cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkyl-

sulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino, C_3-C_6-trialkylsilyl or represents in each case optionally mono- or polysubstituted phenyl, benzyl or phenoxy, where the substituents independently of one another may be selected from the group consisting of C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-haloalkyl, C_2-C_4-haloalkenyl, C_2-C_4-haloalkynyl, C_3-C_6-halocycloalkyl, halogen, cyano, nitro, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino, C_3-C_6-(alkyl)-cycloalkylamino, C_2-C_4-alkylcarbonyl, C_2-C_6-alkoxycarbonyl, C_2-C_6-alkyl-aminocarbonyl, C_3-C_8-dialkylaminocarbonyl and C_3-C_6-trialkylsilyl,

R^5 and R^8 in each case independently of one another represent hydrogen, halogen or represent in each case optionally substituted C_1-C_4-alkyl, C_1-C_4-haloalkyl, R^{12}, G, J, -OJ, -OG, -$S(O)_p$-J, -$S(O)_p$-G, -$S(O)_p$-phenyl, where the substituents independently of one another may be selected from one to three radicals W or from the group consisting of R^{12}, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_4-alkoxy and C_1-C_4-alkythio, where each substituent may be substituted by one or more substituents independently of one another selected from the group consisting of G, J, R^6, halogen, cyano, nitro, amino, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-trialkylsilyl, phenyl and phenoxy, where each phenyl or phenoxy ring may optionally be substituted and where the substituents independently of one another may be selected from one to three radicals W or one or more radicals R^{12},

G in each case independently of one another represent a 5- or 6-membered nonaromatic carbocyclic or heterocyclic ring which optionally contains one or two ring members from the group consisting of C(=O), SO and $S(=O)_2$ and which may optionally be substituted by one to four substituents independently of one another selected from the group consisting of C_1-C_2-alkyl, halogen, cyano, nitro and C_1-C_2-alkoxy, or independently of one another represent C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_7-cycloalkyl, (cyano)C_3-C_7-cycloalkyl, (C_1-C_4-alkyl)C_3-C_6-cycloalkyl, (C_3-C_6-cycloalkyl)C_1-C_4-alkyl, where each cycloalkyl, (alkyl)cycloalkyl and (cycloalkyl)-alkyl may optionally be substituted by one or more halogen atoms,

J in each case independently of one another represent an optionally substituted 5- or 6-membered heteroaromatic ring, where the substituents independently of one another may be selected from one to three radicals W or one or more radicals R^{12},

R^6 independently of one another represent $-C(=E^1)R^{19}$, $-LC(=E^1)R^{19}$, $-C(=E^1)LR^{19}$, $-LC(=E^1)LR^{19}$, $-OP(=Q)(OR^{19})_2$, $-SO_2LR^{18}$ or $-LSO_2LR^{19}$, where each E^1 independently of the others represents O, S, N-R^{15}, N-OR^{15}, N-$N(R^{15})_2$, N-S=O, N-CN or N-NO_2,

R^7 represents hydrogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, halogen, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl,

R^9 represents C_1-C_4-haloalkyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylsulfinyl or halogen,

R^{10} represents hydrogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, halogen, cyano or C_1-C_4-haloalkoxy,

R^{11} in each case independently of one another represent in each case optionally mono- to trisubstituted C_1-C_6-alkylthio, C_1-C_6-alkylsulfenyl, C_1-C_6-haloalkythio, C_1-C_6-haloalkylsulfenyl, phenylthio or phenylsulfenyl, where the substituents independently of one another may be selected from the list consisting of W, $-S(O)_nN(R^{16})_2$, $-C(=O)R^{13}$, $-L(C=O)R^{14}$, $-S(C=O)LR^{14}$, $-C(=O)LR^{13}$, $-S(O)_nNR^{13}C(=O)R^{13}$, $-S(O)_nNR^{13}C(=O)LR^{14}$ and $-S(O)_nNR^{13}S(O)_2LR^{14}$,

L in each case independently of one another represent O, NR^{18} or S,

R^{12} in each case independently of one another represent $-B(OR^{17})_2$, amino, SH, thiocyanato, C_3-C_8-trialkylsilyloxy, C_1-C_4-alkyl disulfide, $-SF_5$, $-C(=E^1)R^{19}$, $-LC(=E^1)R^{19}$, $-C(=E^1)LR^{19}$, $-LC(=E^1)LR^{19}$, $-OP(=Q)(OR^{19})_2$, $-SO_2LR^{19}$ or $-LSO_2LR^{19}$,

Q represents O or S,

R^{13} in each case independently of one another represent hydrogen or represent in each case optionally mono- or polysubstituted C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_6-cycloalkyl, where the substituents independently of one another may be selected from the group consisting of R^6, halogen, cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino and (C_1-C_4-alkyl)C_3-C_6-cycloalkylamino,

R^{14} in each case independently of one another represent in each case mono- or polysubstituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_2-C_{20}-alkynyl or C_3-C_6-cycloalkyl, where the substituents independently of one another may be selected from the group consisting of R^6, halogen, cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino and (C_1-C_4-alkyl)C_3-C_6-cycloalkylamino or represent optionally substituted phenyl, where the substituents independently of one another may be selected from one to three radicals W or one or more radicals R^{12},

R^{15} in each case independently of one another represent hydrogen or represent in each case mono- or polysubstituted C_1-C_6-haloalkyl or C_1-C_6-alkyl, where the substituents independently of one another may be selected from the group consisting of cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_2-C_6-alkoxycarbonyl, C_2-C_6-alkylcarbonyl, C_3-C_6-trialkylsilyl and optionally substituted phenyl, where the substituents independently of one another may be selected from one to three radicals W or one or more radicals R^{12}, or $N(R^{15})_2$ represents a cycle which forms the ring M,

R^{16} represents C_1-C_{12}-alkyl or C_1-C_{12}-haloalkyl, or $N(R^{16})_2$ represents a cycle which forms the ring M,

R^{17} in each case independently of one another represent hydrogen or C_1-C_4-alkyl, or $B(OR^{17})_2$ represents a ring, where the two oxygen atoms are attached via a chain to two or three carbon atoms which are optionally substituted by one or two substituents independently of one another selected from the group consisting of methyl and C_2-C_6-alkoxycarbonyl,

R^{18} in each case independently of one another represent hydrogen, C_1-C_6-alkyl or C_1-C_6-haloalkyl, or $N(R^{13})(R^{18})$ represents a cycle which forms the ring M,

R^{19} in each case independently of one another represent hydrogen or represent in each case optionally mono- or polysubstituted C_1-C_6-alkyl, where the substituents independently of one another may be selected from the group consisting of cyano, nitro, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkylsulfinyl, C_1-C_4-haloalkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, CO_2H, C_2-C_6-alkoxycarbonyl, C_2-C_6-alkylcarbonyl, C_3-C_6-trialkylsilyl and optionally substituted phenyl, where the substituents independently of one another may be selected from one to three radicals W, C_1-C_6-haloalkyl, C_3-C_6-cycloalkyl or phenyl or pyridyl, each of which is optionally mono- to trisubstituted by W,

M in each case represents an optionally mono- to tetrasubstituted ring which, in addition to the nitrogen atom which is attached to the substituent pair R^{13} and R^{18}, $(R^{15})_2$ or $(R^{16})_2$, contains two to six carbon atoms and optionally additionally a further nitrogen, sulfur or oxygen atom, and where the substituents independently of one another may be selected from the group consisting of C_1-C_2-alkyl, halogen, cyano, nitro and C_1-C_2-alkoxy,

W in each case independently of one another represent C_1-C_4-alkyl, C_2-C_4-alkenyl,

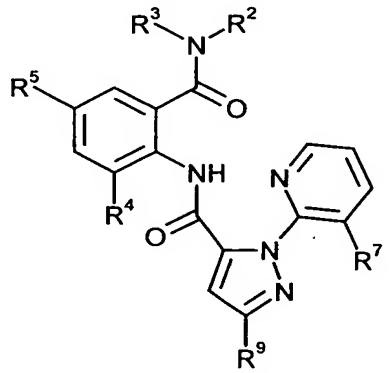
C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-haloalkyl, C_2-C_4-haloalkenyl, C_2-C_4-haloalkynyl, C_3-C_6-halocycloalkyl, halogen, cyano, nitro, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-alkylamino, C_2-C_8-dialkylamino, C_3-C_6-cycloalkylamino, (C_1-C_4-alkyl)C_3-C_6-cycloalkylamino, C_2-C_4-alkylcarbonyl, C_2-C_6-alkoxycarbonyl, CO_2H, C_2-C_6-alkylaminocarbonyl, C_3-C_8-dialkylaminocarbonyl or C_3-C_6-trialkylsilyl,

n in each case independently of one another represent 0 or 1,

p in each case independently of one another represent 0, 1 or 2.

where in the case that (a) R^5 represents hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-haloalkenyl, C_2-C_6-haloalkynyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio or halogen and (b) R^8 represents hydrogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-haloalkenyl, C_2-C_6-haloalkynyl, C_1-C_4-haloalkoxy, C_1-C_4-haloalkylthio, halogen, C_2-C_4-alkylcarbonyl, C_2-C_6-alkoxycarbonyl, C_2-C_6-alkylaminocarbonyl or C_3-C_8 dialkylaminocarbonyl, (c) at least one substituent selected from the group consisting of R^6, R^{11} and R^{12} is present and (d), if R^{12} is not present, at least one R^6 or R^{11} is different from C_2-C_6-alkylcarbonyl, C_2-C_6 alkoxycarbonyl, C_2-C_6-alkylaminocarbonyl and C_3-C_8-dialkylaminocarbonyl.

4. The composition as claimed in claim 1, 2 or 3, comprising at least one active compound from the group of the anthranilamides of the formula (II-1)



(II-1)

in which

R^2 represents hydrogen or C_1-C_6-alkyl,

R^3 represents C_1-C_6-alkyl which is optionally substituted by a radical R^6,

R^4 represents C_1-C_4-alkyl, C_1-C_2-haloalkyl, C_1-C_2-haloalkoxy or halogen,

R^5 represents hydrogen, C_1-C_4-alkyl, C_1-C_2-haloalkyl, C_1-C_2-haloalkoxy or halogen,

R^6 represents $-C(=E^2)R^{19}$, $-LC(=E^2)R^{19}$, $-C(=E^2)LR^{19}$ or $-LC(=E^2)LR^{19}$, where each E^2 independently of the others represents O, S, N-R^{15}, N-OR^{15}, N-$N(R^{15})_2$, and each L independently of the others represents O or NR^{18},

R^7 represents C_1-C_4-haloalkyl or halogen,

R^9 represents C_1-C_2-haloalkyl, C_1-C_2-haloalkoxy, $S(O)_pC_1$-C_2-haloalkyl or halogen,

R^{15} in each case independently of one another represent hydrogen or represent in each case optionally substituted C_1-C_6-haloalkyl or C_1-C_6-alkyl, where the substituents independently of one another may be selected from the group consisting of cyano, C_1-C_4-alkoxy, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfinyl, C_1-C_4-alkylsulfonyl, C_1-C_4-haloalkylthio, C_1-C_4-haloalkylsulfinyl or C_1-C_4-haloalkylsulfonyl,

R^{18} in each case represents hydrogen or C_1-C_4-alkyl,

R^{19} in each case independently of one another represent hydrogen or C_1-C_6-alkyl,

p independently of one another represents 0, 1, 2.

5. The composition as claimed in claimed in claim 1, 2, 3 or 4, comprising the agonist or antagonist of nicotinergic acetylcholine receptors of the formula (I) and an anthranilamide of the formula (II) in a ratio of from 250:1 to 1:50.

6. The use of a synergistically effective mixture comprising compounds of the formula (I) as set forth in claim 1 or 2 and at least one anthranilamide of the formula (II) for controlling animal pests.

7. A process for preparing pesticides, characterized in that a synergistically effective mixture comprising compounds of the formula (I) as set forth in claim 1 or 2 and at least one anthranilamide of the formula (II) are mixed with extenders and/or surfactants.